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9. WHEELER, W. M. (1910). Ants, their Structure, Development, and Behavior, pp. 357–360, 2 figs.

EXPLANATION OF PLATES II AND III.

Fig. 1. Larva of *Lycæna piasus,* dorsal view, showing position of external organs. (× 15.)

Fig. 2. Posterior part of same, lateral view, showing appearance of organs when protruded.

Fig. 3. Section through retracted evaginable organ; from vertical longitudinal sections of larva. (Camera lucida drawing, × 320.)

Fig. 4. A single seta of the evaginable organ, and its cell.

Fig. 5. Distal attachment of retractor muscle of evaginable organ to the body wall.

Fig. 6. Cross section of dorsal portion of larva through two of the glands; external opening not shown. (Camera lucida drawing, × 80.)

Fig. 7. Central portion of same, more enlarged. (× 220.)

Fig. 8. Section through opening of 10th segment, and sac, the latter everted; from vertical longitudinal sections of larva. (Camera lucida drawing, × 120.)

Fig. 9. Dorsal view of glands, the skin being removed except around the opening; from dissection. (Camera lucida drawing, × 90.)

Fig. 10. Ventral view of glands; from dissection. (Camera lucida drawing, × 90.)

b.m, basement membrane; *cut,* cuticula; *d.v,* dorsal vessel; *e.t,* evaginable organs; *f.b,* fat body; *gl,* gland; *h,* hairs about opening of sac; *hyp,* hypodermis; *int,* intima; *l,* lumen of sac; *l.m,* longitudinal muscles; *o,* opening of sac; *p,* sac protruded; *r.m,* retractor muscle; *s,* setæ; *spir,* spiracles; *t.h,* tactile hairs.

VENATIONAL VARIATION IN CLADURA (TIPULIDÆ DIPTERA).[1]

BY C. P. ALEXANDER AND M. D. LEONARD,

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(WITH PLATE IV.)

There have been three species referred to the genus *Cladura* Osten Sacken: *C. flavoferruginea* O. S. (1859), *C. indivisa* O. S. (1861), and a species which Loew called *fuscula* (1873).[2] Osten Sacken asserts,[3] however, that the latter is not a *Cladura* but possibly a

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[1] Contribution from the Entomological Laboratory of Cornell University.

[2] Loew, H., Beschreibung Europäischer Dipteren, v. 3, pp. 64–67.

[3] Osten Sacken, C. R., Studies on Tipulidæ, Berl. Ent. Zeitsch., Bd. 30, 1886, Heft 2, pp. 205, 206.

Limnophila. Professors Mik[4] and Thalhammer[5] also referred this species to the genus *Cladura,* while Bergroth[6] placed it in the genus *Ulomorpha.* Kertesz in the Catalogus Dipterorum regards it as a synonym of *Adelphomyia senilis* Haliday, which position it still holds. Besides the recent species, Scudder[7] has described two fossil species from the Florissant.

DISTRIBUTION OF THE SPECIES.

C. flavoferruginea Osten Sacken.

District of Columbia. Oct. and Nov. (O. S.).

New Hampshire. Hampton, Sept. 30, 1908 (Johnson, New and Little-known Tipulidæ, Proc. Bost. Soc. Nat. Hist., v. 34, p. 126).

New Jersey. Forest Hill, Sept. (Smith, Ins. N. J., 1909, p. 706).

New York. Ithaca, Tompkins Co., Oct., 1909; Sept., Oct., 1910. Erie Co. (autumn, 1909, 1910, M. C. Van Duzee).

Ohio. Wooster, Oct. 19, 1911 (J. S. Houser).

Pennsylvania. Philadelphia, Oct. 4, 1891 (Johnson, *l. c.,* p. 126).

C. indivisa Osten Sacken.

Canada. Quebec (O. S., Cat. Dipt. N. Am., 1878, p. 31).

Massachusetts. Scudder, coll. (O. S., *l. c.,* p. 31).

New York. Trenton Falls, Sept., 1860 (O. S.). Hamburg, Rochester, North Evans and Niagara, Sept. to Nov., 1908 to 1910 (M. C. Van Duzee). Fulton County, 600 feet altitude near Johnstown to 2,000 feet on Pinnacle Mt., 1909 and 1910.

SEASONAL RANGE.

The members of the genus are late summer and autumnal in their appearance, being, however, most numerous in September and early October. The earliest record is Aug. 20, 1909 (Woodworths Lake, Fulton Co., N. Y.); the latest, Nov. 11, 1909 (Buffalo N. Y.; Van Duzee).

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[4] Mik, J., Wien. Ent. Zeitg., 7, 30, 48, 1888.

[5] Thalhammer, J. S., Fauna Regni Hung., Dipt., 18, 15, 1899.

[6] Bergroth, E., Wien. Ent. Zeitg., 8, 117, 1889.

[7] Scudder, S. H., Tertiary Tipulidæ, Proc. Am. Phil. Soc., V, 32, pp. 214–216; pl. 4, figs. 1 and 8.

VALIDITY OF THE SPECIES.

As can be seen by reference to the original descriptions and to the accounts of the species in the Monographs of the Diptera (v. 4; pp. 188, 189), the species are very closely related. The color of *C. flavoferruginea* is "ferruginous-yellow"; that of *C. indivisa,* "yellow." In both species, "pleuræ spotted, abdomen banded with brown." The size of the species is the same. The main difference, however, and that on which the second species, *indivisa,* was separated, is that *flavoferruginea* has a supernumerary cross-vein in cell R_3 (second submarginal cell of Osten Sacken) while *indivisa* has none.

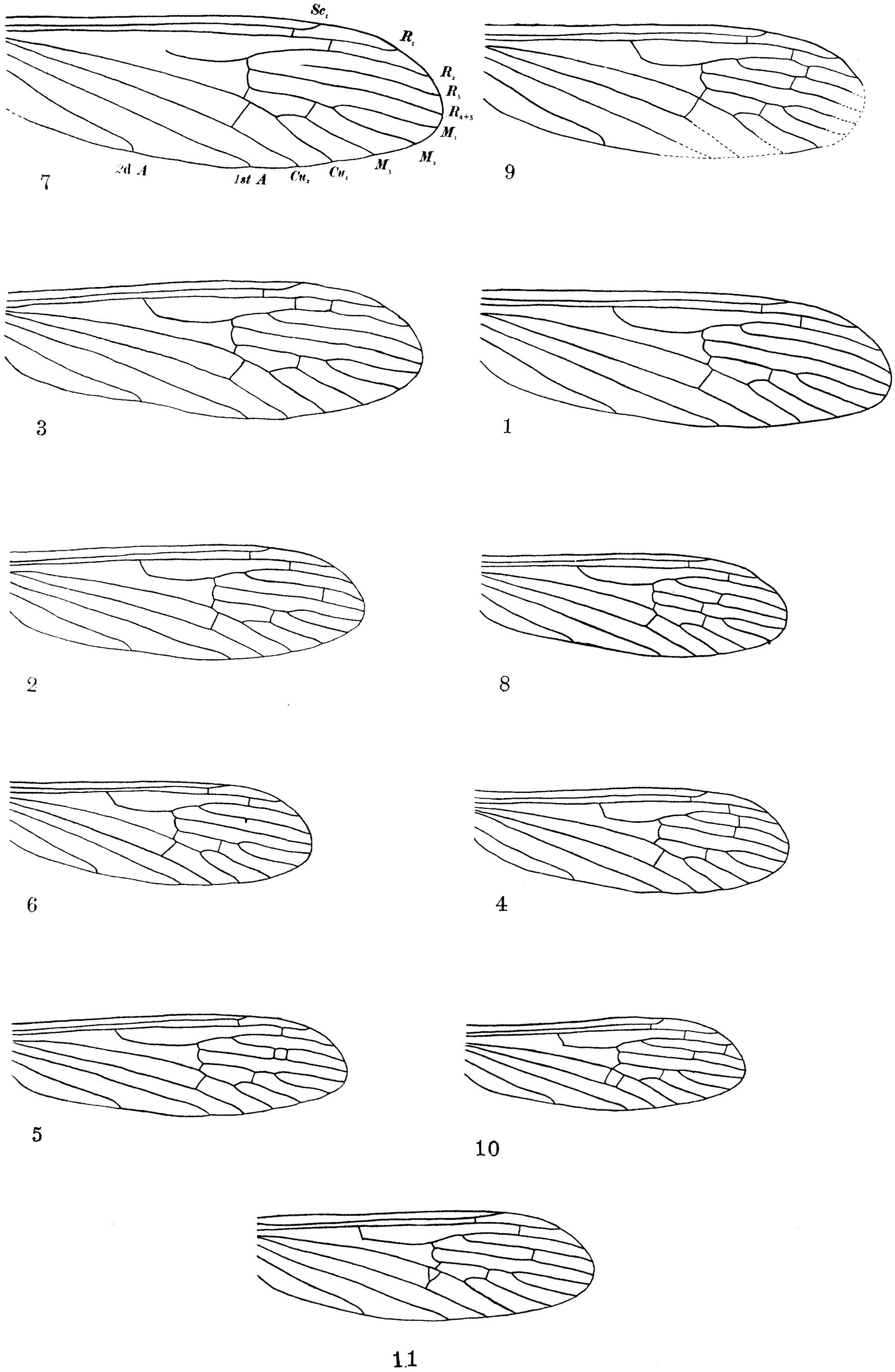
In the examination of 154 specimens, of both sexes, from the localities mentioned above, it was found that the two species are not distinct. Fifty, or about one third, were, on the basis of the supernumerary cross-vein, clearly referable to *flavoferruginea;* seventy-two, or nearly one half, to *indivisa,* while the remaining thirty-two included almost every possible intergradation between them.

It is significant that of the seven specimens of *flavoferruginea* that Osten Sacken had before him at the time of the original publication, one possessed a supernumerary cross-vein in cell R_2 in both wings. As can be seen from the following data, the species *indivisa* must fall as a synonym of the type *flavoferruginea.* Mr. M. C. Van Duzee, of Buffalo, N. Y., came, quite independently, to the same conclusion.

A STUDY OF THE WING BY FIELDS.

Subcostal field: The tendency of vein Sc_2 to migrate backwards is well-marked. In one extreme, Sc_2 equals Sc_1; in the other extreme, Sc_1 is fully five times the length of Sc_2.

Radial field: Fig. 1 shows a normal *indivisa* wing possessing only the radial cross-vein. Fig. 2 shows a normal *flavoferruginea* wing, possessing, besides a radial cross-vein, the supernumerary cross-vein in cell R_3. The radial cross-vein is probably always present. In three specimens, one a female in both wings, in the other two, males, in the left and right wings respectively, there is a supernumerary cross-vein beside the radial cross-vein (see Fig. 3). Cell R_2: Many specimens possess a supernumerary cross-vein in this cell. This occurs both in the *flavoferruginea* form (Fig. 4) and in the *indivisa* form. In the former case this cross-vein varies greatly in its relative position to



Venation of Cladura.

the cross-veins in cells R_1 and R_3; when in a line with these cross-veins a strong secondary bracing is brought about distad of the cord. Fig. 10 shows a wing in which it is near the distal end of the cell. Cell R_3: The supernumerary cross-vein of the *flavoferruginea* form occurs in all individuals referable to this form. The position of this cross-vein as compared with the radial cross-vein in cell R_1 is extremely variable. In many wings it is far distad, as in Fig. 2; in others it is exactly underneath the radial cross-vein while in a few specimens it is far proximad of it. In a few specimens (Fig. 5) a supernumerary cross-vein is found beside the normal one in cell R_3. In one specimen, a female, the right wing is normal *flavoferruginea* as to venation while the left wing (Fig. 6) has a spur traversing only a part of the cell R_3, thus marking an intermediate condition between the two forms. Cell R_5: One specimen, a male, shows, in the right wing only, a supernumerary cross-vein slightly proximad of the median cross-vein (Fig. 8). Concerning the arcuation of the radial sector (præfurca of Osten Sacken) there is considerable variation. The normal arcuation is shown in Fig. 1 but a more gentle arcuation is common as in Fig. 8. An approach to the other extreme is seen in Fig. 4 where the tendency of the sector to be angular appears; a few specimens show this tendency very strongly, the angle being a right one and spurred. Fig. 7 shows a specimen which lacks the base of the sector in both wings.

Median field: There is little variation in the relative length of cell M_1 and its petiole. With the exception of the anal field this is the most constant in the wing.

Cubital field: The notable feature here is the variation in the position of the basal deflection of Cu_1 (great cross-vein). In some specimens it is exactly under the middle of cell first M_2 (discal cell); in others it has retreated proximad (Fig. 4) until it reaches the extreme condition shown in Fig. 9 where it is underneath the fork of M. Of two specimens from Wooster, Ohio (Houser), one has a supernumerary cross-vein proximad of the basal deflection of Cu_1 (Fig. 10); the other has this cross-vein united caudad with the basal deflection of Cu_1, diverging cephalad to form a Y-shaped figure (Fig. 11).

The figures were all drawn to scale by means of the projection microscope in the entomological laboratory of Cornell University and show the wide variation in the size of the wings of the various specimens.

The only other species which shows such an abundance of supernumerary cross-veins is *Tricyphona inconstans* Osten Sacken. (See Johnson, Variation in the Venation of *Amalopis inconstans* O. S.; Ent. News, v. 12, pp. 305-307.)

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THE OCCURRENCE OF THE MYMARID GENUS STEPHANODES ENOCK IN NORTH AMERICA.

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I have accidentally captured a species of the recently described British genus *Stephanodes* Enock in Illinois.

The very close relation of this genus to *Polynema* Haliday should be emphasized. It bears the same relation to that genus that *Anaphoidea* Girault bears to *Anaphes* Haliday and that *Paranagrus* Perkins bears to *Anagrus* Haliday, though, perhaps still less separable. At the best, all three are no more than subgenera. The genus *Stephanodes* was described in 1909 by Enock (1909) from *Stephanodes elegans* Enock occurring at Woking, Burnham Beeches and Somerset, England. It differs from *Polynema* according to Enock in having the scape armed beneath with a series of minute teeth, similar to those found along the under side of the posterior femora in the Chalcididæ; and in habitus as expressed in its "gait" when in locomotion.[1] The habitus of Mymarids differs considerably; in the same way Trichogrammatids differ and the two families may be distinguished at a

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[1] The third characteristic, the carina on the head, is common to several genera, including *Polynema;* also in *Polynema bifasciatipenne* (Girault) the scapes are slightly asperate beneath and the first funicle joint very long, another difference between *Stephanodes* and most *Polynemas.* In some of the latter, several tuberculate teeth are present on the scape beneath.